

TIPHIA OF THE WEST INDIES

(HYMENOPTERA: TIPHIDAE)^{1,2}

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ABSTRACT—Descriptions or diagnostic notes and keys are presented for 17 species of *Tiphia*, illustrated by 20 text figures. Newly described species are *gopauli*, *puertoricensis*, *jamaica*, *grenada*, *howdeni*, and *laudata*.

The author has recently made a study of the genus *Tiphia* F. from the islands around the Caribbean. Material has been seen from the Academy of Natural Sciences of Philadelphia [ANSP] and the six collections enumerated below. Aside from the material which was studied by Allen and Krombein (1961) only about 160 specimens are available. However, among these are several series of specimens collected at the same time and place which represent previously undescribed species. As usual, males and females have rarely been collected at the same time and place and the relationships of the sexes remains obscure. Of the several genera of Tiphinae occurring in the Americas, only the genus *Tiphia* has been found in the West Indies.

Despite the fact that the islands of the West Indies are scattered over a large area of at least 1,600 by 1,000 miles, its tiphine fauna seems restricted to a few species, many of which are closely related. In those species known in the male sex, the radial cell is usually distinctly elongated and the first tergum has a transverse carina. However, such diversification as elongated tegulae, dense patches of abdominal pile, denticulate mandibles, special tufts of hair on the sixth sternum, pygidium enclosed within encircling carinae, sternal denticles, all found in the North American fauna appear to be completely lacking in the West Indies. It seems likely that West Indian *Tiphia* may have greater affinity to species on the northern coast of South America, but to date this fauna is comparatively unknown.

The fact that the numerous references to *T. parallela* Smith have been excluded from this paper requires explanation. This species was described by Smith in 1879 from a female taken far up the Amazon, at Teffe, only a few miles south of the equator. The holotype is in the British Museum and has recently been redescribed by the author (Allen, 1962). While this species, as represented by the female, lacks exceptional characters, it is not likely that it occurs in any of the

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islands of the West Indies, having a much different ecological environment. In the economic literature *parallela* is represented as occurring naturally in Barbados, Antigua, Venezuela and Guyana, and on several different hosts. It is my opinion that the *Tiphia* species discussed in the economic literature under the name *parallela* probably represents more than one species none of which is the *parallela* indigenous to the Amazon.

In addition to the few West Indian specimens in the Academy of Natural Sciences of Philadelphia, I am indebted to the following museums and collections for material studied in the preparation of this paper: American Museum of Natural History [AMNH] through J. G. Rosen, Jr.; Canadian National Collection [CNC] through M. Ivanochko; Cornell University [CU] through L. L. Pechuman; Museum of Comparative Zoology [MCZ] through H. E. Evans; U. S. National Museum [USNM] through K. V. Krombein.

Illustrations in this paper are by Peter H. McElhinney.

KEY TO SPECIES OF *Tiphia* OF THE WEST INDIES

1. Males 2
Females 15
2. Tergum 1 with an anterior transverse carina 3
Tergum 1 without an anterior transverse carina 10
3. Transverse carina of tergum 1 obscure, interrupted, or subobsolete 4
Transverse carina of tergum 1 high and complete; not obscure or irregular 5
4. Punctures of terga not greatly enlarged (Dominica) (1) **dominicæ** Allen
Punctures of terga greatly enlarged and dimpled (Trinidad) (2) **gopauli**, n. sp.
5. Outer disc of mesopleuron conspicuously hairy, with secondary punctures much more numerous than primaries; inner face of hind tibia usually with a well-developed ridge 6
Outer disc of mesopleuron only sparsely hairy with secondary punctures at most only about equal in number to primaries 7
6. Head width averages 2.05 times least distance between eyes (Cuba, Jamaica) (3) **argentipes** Cresson
Head width averages 2.25 times least distance between eyes (Haiti) (4) **sandæ** Allen & Krombein
7. Anterior sector of second cubital cell 1.3 times as long as posterior sector (Dominica) (5) **layouæ** Allen
Anterior sector of second cubital cell less than 1.3 times as long as posterior sector 8
8. With bare, keel-shaped callosity on anterior middle of sternum 2 (Haiti) (6) **hispaniolæ** Wolcott
Sternum 2 without bare, keel-shaped callosity 9
9. Tegula and abdomen not shagreened (Puerto Rico) ... (7) **puertoricensis**, n. sp.
Tegula and abdominal terga shagreened (Jamaica) (8) **jamaica**, n. sp.

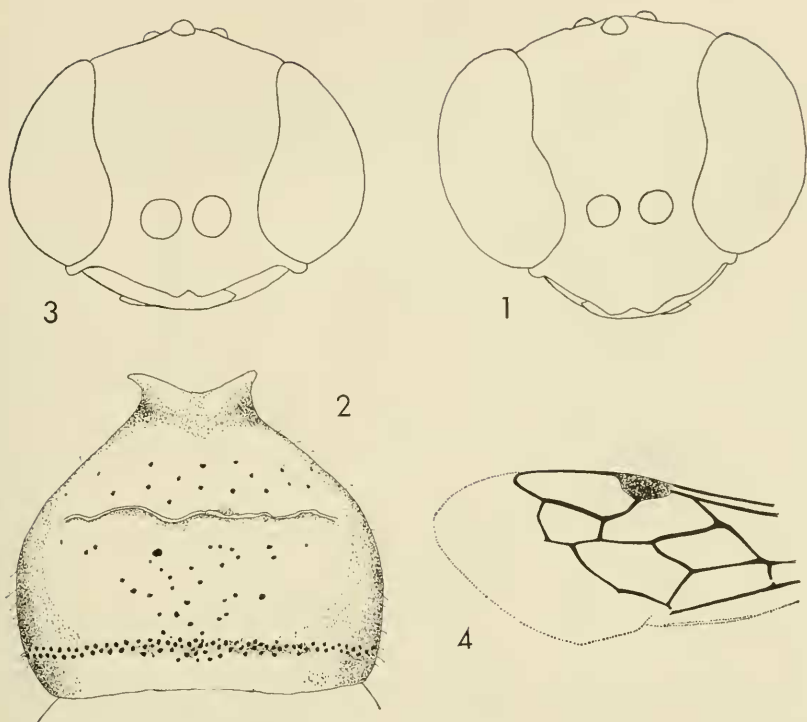
10. Radial cell distinctly less than second cubital cell in lateral extension (Haiti, St. Kitts) (9) **paupi** Allen & Krombein
Radial cell exceeding or at least equal to second cubital cell in lateral extension 11
11. Tegula with a fine, complete groove about outer and apical margins (Grenada) (10) **grenada**, n. sp.
Tegula without groove on outer margin 12
12. Punctures of discal areas of terga 3, 4, and 5 greatly enlarged and dimpled (Trinidad) (2) **gopauli**, n. sp.
Punctures on dorsal discal areas of terga not dimpled or greatly enlarged 13
13. Head width 2.7 times least distance between eyes (Dominica) (1) **dominicæ** Allen
Head width not more than 2.4 times least distance between eyes 14
14. Head width 2.2 times least distance between eyes (Haiti) (11) **kenseoffi** Allen & Krombein
Head width 2.4 times least distance between eyes; punctures of front, dorsal pronotum and scutum small and widely separated (Jamaica) (12) **howdeni**, n. sp.
15. (Females) Without groove on hind basitarsus 16
With groove on hind basitarsus 17
16. Hind basitarsus without ciliate hairs on inside except on apical third (Haiti) (6) **hispaniolæ** Wolcott
Hind basitarsus setulose from base to apex (Cuba, Jamaica) (3) **argentipes** Cresson
17. Tergum 1 with obscure transverse carina (Dominica) (13) **laudata**, n. sp.
Tergum 1 without transverse carina 18
18. Tegula not shagreened, except sometimes obscurely on inner half 19
Tegula broadly shagreened 21
19. Tegula with a fine, regular groove about outer and posterior margins (Grenada) (10) **grenada**, n. sp.
Tegula without groove on outer margin 20
20. Radial cell with spur directed to nearest point on costal margin (Cuba) (14) **dowi** Allen & Krombein
Radial cell without terminal spur (Haiti) (15) **woleotti** Allen & Krombein
21. Dorsal pronotum with only 4 to 5 punctures anterior to transverse median belt; outer disc of mesopleuron almost devoid of primary punctures (Jamaica) (16) **nitida** Smith
Dorsal pronotum densely punctate; outer disc of mesopleuron with coarse punctures of first- and second-degree density (Haiti) (17) **haiti** Allen & Krombein

1. *Tiphia* (*Tiphia*) **dominicæ** Allen

(Figs. 1, 2)

Tiphia dominicæ Allen, 1967, Proc. U. S. Nat. Mus. 123 (3617):1.

Diagnosis.—Male. Cheek much narrower than diameter of antennal fossa. Head width 2.6 to 2.9 times least distance between eyes. Outline of head, fig. 1. Mesopleuron with primary punctures small and usually separated by several times their average diameter; secondary punctures minute and numerous only on upper margins. Tegula not shagreened; without marginal grooves. Forewing



Figs. 1-2, *Tiphia dominicae* Allen, D'leau Gommier, Dominica: 1, outline of head, ♂; 2, dorsum of tergum 1, ♂. Figs. 3-4, *T. gopauli*, n. sp., Trinidad: 3, outline of head, ♂; 4, forewing, ♂.

with anterior sector of second cubital cell at least 1.3 times as long as posterior sector. Tergum 1 (fig. 2) either without anterior transverse carina or with an obscurely developed one. Intermediate terga with its primary punctures usually small and widely separated. Sternum 2 with obscure median, keel-like callosity. Terga 3 to 6 moderately shagreened. Sternum 5 without lateral denticles. Length 6 to 9 mm.

Discussion.—The original description contains much more detail. The female is unknown. It appears to be related to *kenscoffi* from Haiti and *howdeni* from Jamaica, but the interval between the eyes is much narrower than in these species or any other known West Indian species. In addition to the type series, three males collected on Dominica by H. W. Foote in 1913 have been identified. Localities on Dominica from which it has been collected are: D'leau Gommier, near Layou River, Pond Figue R. near Chiltern, Freshwater Lake, Roseau, and at Clarke Hall in Layou Valley. About 46 specimens have been identified.

2. *Tiphia* (*Tiphia*) *gopauli*, n. sp.
(Figs. 3, 4)

Male.—Front with punctures ranging from contiguous on lower half to third-degree density on middle of upper half, without interspaces as wide as an ocellus; numerous secondaries on lower half. Head width 2.45 times least distance between eyes (2 measured were 2.5, 2.4). Head outline, fig. 3. Cheek slightly narrower than antennal fossa.

Dorsal pronotum with sharp-crested transverse carina; bordering sulcus with a few weak, scattered cross ridges; punctures very coarse, deep, of irregular first-degree density. Lateral pronotum with a faint crescent-shaped escarpment jutting into lower part of disc. Mesopleuron on its outer disc with coarse primary punctures separated in most directions by more than their average diameters; with rather large secondaries about as numerous as primaries; subtegular patch of dense microsetae not as wide as tegula. Legs black; inner face of hind tibia with high ridge extending to friction plate. Tegula not shagreened; without groove on outside margin, posterior marginal groove terminating laterally in a line of irregular punctures. Forewing (fig. 4) with membrane slightly infusate; radial cell greatly exceeding second cubital cell in lateral extension, terminal section not sharply bent near middle, cell 2.6 times as long as wide; anterior section of second cubital cell 1.2 times length of posterior section.

Dorsal propodeum only slightly tapered with slightly concave sides, about one and one-half times as long as apical width, median carina linear and nearly complete. Tergum 1 with a weak, irregular, and interrupted transverse carina; preapical band in a narrow, deeply impressed trench, consisting of closely appressed more or less coalesced punctures separated from apex by a narrow ridge. Anterior sulcus of tergum 2 with a complete unbroken series of cross ridges. Terga 3 to 6 each with a middle belt of conspicuously enlarged and dimpled punctures bordered in front and back by much smaller punctures. Sternum 5 without lateral denticles.

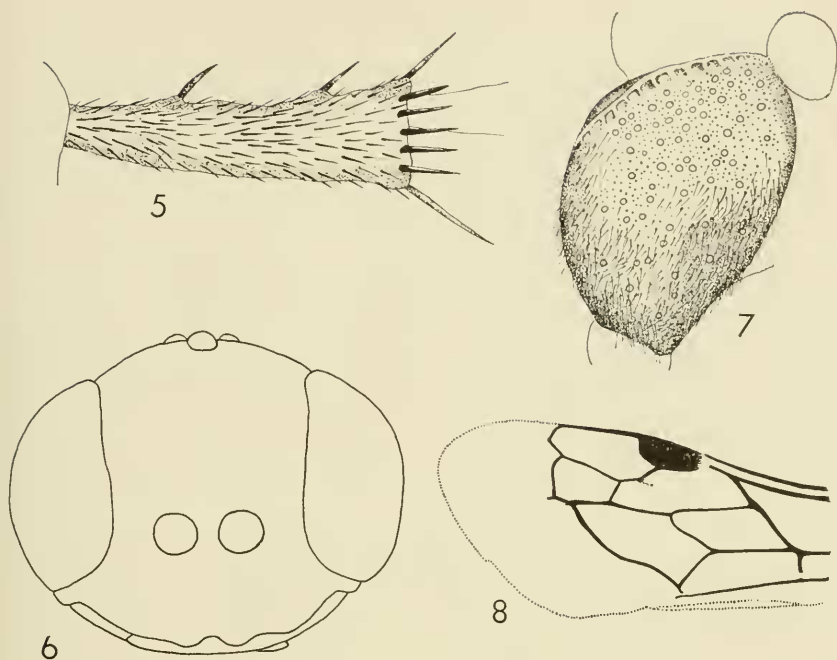
Length, 7.0 to 8.3 mm.

Female.—Unknown.

Holotype.—♂; Trinidad, W. I. "D. Martin" 11-3-1961 (N. Gopaul) [CNC].

Paratype.—1; Tucuche, Trinidad, 31-V-1925 (H. M. Rohwer) [USNM].

Discussion.—*T. gopauli* is distinguished from other known West Indian species by the weak, poorly defined transverse carina on the first tergum, and especially by the intrenched preapical band of this tergum separated from the apex by only a narrow ridge, and the greatly enlarged and dimpled punctures of the dorsal abdomen. On the type specimen there is an obscure crease on tergum 1 at the usual location of the transverse carina. On the paratype this crease is further reduced to an irregular connected line of punctures. A sub-obsolete transverse tergal carina is also found in *dominica*. This species lacks the conspicuously enlarged punctures of the abdominal terga.



Figs. 5-8, *Tiphia argentipes* Cresson, Cuba: 5, inner face of hind basitarsus, ♀, Vilches Portero; 6, outline of head, ♂, Vilches Portero; 7, left mesopleuron, ♀, showing densely bipunctate character, Cienfuegos; 8, forewing, ♂, Vilches Portero.

3. *Tiphia (Tiphia) argentipes* Cresson (Figs. 5, 6, 7, 8)

Tiphia argentipes Cresson, 1865, Proc. Ent. Soc. Philadelphia 4:117.—Allen & Krombein, 1961, Trans. Amer. Ent. Soc. 87:63.

Diagnosis.—Female. Punctures of dorsal pronotum concentrated in band at edge of impunctate part. Hind basitarsus (fig. 5) on inner face without groove and without area bare of hairs. Tegula without groove on outer margin. Pygidium punctate on basal half, impunctate part conspicuously shagreened to near apex. Length 12 to 16 mm. Male. Front covered with coarse contiguous punctures except on median vitta; with numerous secondaries extending into upper half; head width 2.05 times least distance between eyes (4 measured were 2.0, 2.2, 2.0, 2.0). Head outline, fig. 6. Mesopleuron (fig. 7) everywhere with small secondary punctures much more numerous than primaries, and with dense white hairs. Hind tibia on inner face usually with carina or naked stripe extending to near friction plate. Tegula without groove on outer margin. Forewing (fig. 8) with radial cell short and broad, 2.4 times as long as wide (3 measured were 2.4, 2.6, 2.2), slightly exceeding second cubital cell in lateral extension, with a conspicuous bend at its apex. Tergum 1 with a well-developed transverse carina. Length 7 to 10 mm.

Discussion.—This species was described more than a century ago and several references to it appeared in the literature long before the specific characters of the genus were known. Thus reference to places other than Cuba or Jamaica are probably erroneous. In the type series in the Academy of Natural Sciences of Philadelphia there are the type female and paratype males and females. Allen & Krombein (1961) redescribed both sexes in detail from the type series. *T. argentipes* has been identified more frequently than any other West Indian species. It is widely distributed in Cuba and apparently occurs also in Jamaica. Specimens have been identified in the collections of the Museum of Comparative Zoology, the American Museum of Natural History, the U. S. National Museum, and Cornell University. A total of 54 males and 14 females have been identified.

Distribution.—CUBA: Camaguey; "Castillo de Jagua" (Cienfuegos); "Cerro Cabros"; Cienfuegos; Cristo (Oriente); El Cano, (Habana); Guantanamo; Habana; L. de Ariguanabo; Nagua; near Pinar Rio; "San Carlos Est." (Quant.); Santa Clara; Santiago du Las Vegas; "Soledad"; upper Yara Valley, Zaragoza, (Hab.). JAMAICA: "Georges Valley"; "Hardwar"; "Good Hope"; Mandeville. Two females have been tentatively identified from San Domingo. Localities not verified are in quotations.

4. *Tiphia* (*Tiphia*) *sandae* Allen & Krombein

Tiphia sandae Allen & Krombein, 1961, Trans. Amer. Ent. Soc. 87:60.

Diagnosis.—Male. Very close to *argentipes*; having the same hirsute mesopleuron with many secondary punctures; a tegula which lacks shagreening or a groove on outer margin; tergum 1 with a strong transverse carina and an abruptly convex polished area in front of the impressed preapical band; an abrupt bend in the apical section of the radial cell; and the same moderate-sized and regularly distributed punctures of the abdominal terga. The length is 8.5 mm. The only significant difference appears to be the ratio of head width to least distance between eyes. In *sandae* it is 2.25, appreciably greater than the 2.05 average for *argentipes*. Since its locality is San Domingo, some distance east of the known range of *argentipes*, I am not yet prepared to consider it a synonym of *argentipes*, the common Cuban species. The above notes are based on examination of the holotype in the Academy of Natural Sciences of Philadelphia. Except for the type and 2 paratype males labelled "San Domingo" no other specimens have been seen.

5. *Tiphia* (*Tiphia*) *layouae* Allen

(Figs. 9, 10)

Tiphia layouae Allen, 1967, Proc. U. S. Nat. Mus. 123 (3617):3.

Diagnosis.—Male. Cheek almost as wide as antennal fossa. Head width ranged in 4 measured from 2.2 to 2.3 times least distance between eyes and averaged 2.25. Head outline, fig. 9. The mesopleuron on its outer disc with

sparse hairs and almost no secondary punctures. Inner face of hind tibia uniformly ciliate without carina or naked streak. Tegula shagreened without groove on outer margin. The forewing (fig. 10) with the sectors of the second cubital cell in terms of the inner sector are 10:24:18:19, thus the anterior sector is 1.3 times as long as the posterior sector. Tergum 1 with a high- well-defined transverse carina. Terga 3 and 4 sparse punctate with relatively small punctures of which the middle ones are slightly dimpled and enlarged.

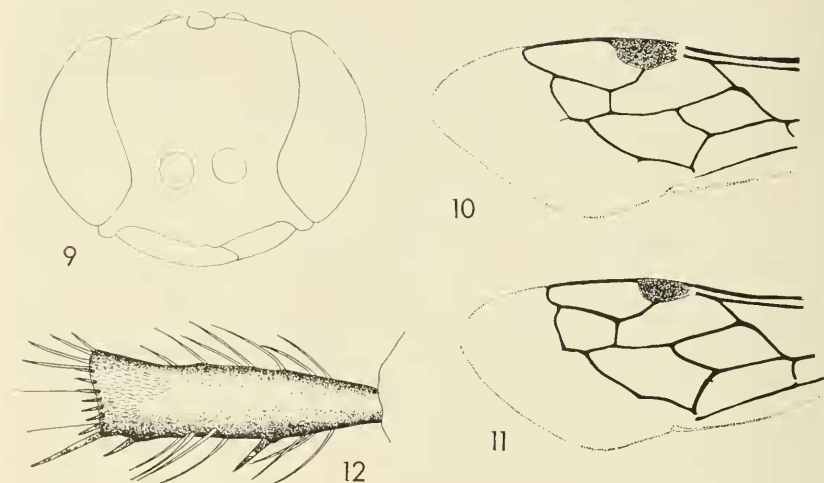
Discussion.—The female is unknown. The holotype and numerous paratypes are in the U. S. National Museum. Known only from Dominica where it has been collected frequently from Pond Figue's R. and Clarke Hall, Layou Valley. Since the original description was published 5 additional specimens, taken by H. W. Foote in 1913 from Dominica [in USNM] and 2 from Long Ditton, Dominica taken 18/20-VI-1911 [in AMNH] have been identified. About 53 males have been identified. In this species and in *dominicæ* the posterior sector of the second cubital cell is unusually short. *T. dominicæ* has a much narrower cheek than *layouæ*.

6. *Tiphia* (*Tiphia*) *hispaniolæ* Wolcott
(Figs. 11, 12)

Tiphia hispaniolæ Wolcott, 1938, Univ. Puerto Rico Jour. Agric. 22:189.—Allen & Krombein, 1961, Trans. Amer. Ent. Soc. 87:58.

Diagnosis.—Male. Front with coarse, contiguous punctures to level of lowest ocellus. Cheek less than width of antennal fossa. Head width 2.2 times least distance between eyes (5 measured were 2.2, 2.0, 2.1, 2.3). Mesopleuron on much of outer disc with secondary punctures not more numerous than primaries. Tegula broadly but faintly shagreened, without groove on outer margin. Forewing (fig. 11) having its second cubital cell with anterior sector 1.1 times length of posterior sector. Tergum 1 with strong transverse carina. Sternum 2 with a bare, median, keel-shaped callosity. Punctures of intermediate tergum rather coarse and approximately uniform in size. Sternum 5 without lateral denticles. Length 7 to 10 mm. Female. Front with very coarse punctures of irregular first-degree density. Dorsal pronotum with faint transverse carina; punctures concentrated in band bordering impunctate apex. Mesopleuron on outer disc with only a few widely separated primary punctures and large, somewhat more numerous secondaries. Hind basitarsus (fig. 12) on inner face with a large area free of hairs and a terminal tuft of dense short microsetae, not grooved. Posterior aspect of propodeum uniformly and conspicuously corticiform. Length 12 to 16 mm.

Discussion.—The holotype male and female paratypes are in the U. S. National Museum. Allen and Krombein redescribed this species in detail from type and paratypes at Washington. A paratype female and several specimens of both sexes are in the tiphine collection at Moorestown, N. J. The keel-like callosity of the second sternum, not noted in species outside the West Indies, is well-developed in *his-*



Figs. 9-10, *Tiphia layouae* Allen, Layou Valley, Dominica: 9, outline of head, ♂; 10, forewing, ♂. Figs. 11-12, *T. hispaniolae* Wolcott, Kenscoff, Haiti: 11, forewing, ♂; 12, inner face of hind basitarsus, ♀.

paniolae. Allen and Krombein found three species among the material named *hispaniolae* by Wolcott. Wolcott noted that *hispaniolae* was found feeding at the honeydew excreted by a scale of guava, and at the flowers of *Daucus carota* and *Pastanica sativa*. In Haiti the species has been taken at "Fond Parisien," Kenscoff, Le Trou, Mt. Puilsboreau, and Port Chabert.

7. *Tiphia* (*Tiphia*) *puertoricensis*, n. sp.
(Fig. 13)

Male.—Front with punctures of first-degree density on lower two-thirds where the primaries are conspicuously mixed with secondaries; tending to second-degree density on upper fourth. Cheek as wide as an antennal fossa. Head width 2.2 times least distance between eyes, (5 measured were 2.2, 2.1, 2.4, 2.3, 2.2). Head outline, fig. 13.

Dorsal pronotum with sharp-crested carina and a bordering sulcus which at humeral angle is conspicuously scalariform; punctate part with punctures fairly uniformly distributed and generally of first-degree density. Lateral pronotum with crescent-shaped escarpment extending halfway across disc. Mesopleuron with coarse primary punctures, uniform in size and distribution and generally of second-degree density; secondaries much less numerous than primaries; subtegular patch of dense microsetae much narrower than tegula. Hind tibia on inner face usually with carina extending almost to basal friction plate. Tegula without shagreening, or groove on outer margin. Forewing with membrane moderately infumate; radial cell greatly exceeds second cubital cell in lateral

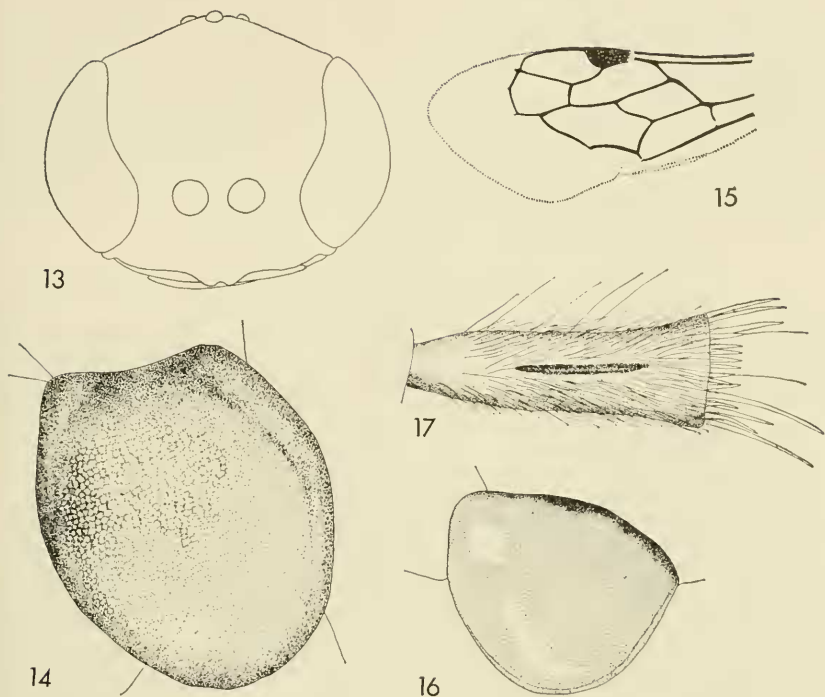


Fig. 13, *Tiphia puertoricensis*, n. sp., Santa Rita, P. R., outline of head, ♂. Fig. 14, *T. jamaica*, n. sp., Mandeville, Jam., left tegula, ♂, showing shagreening. Fig. 15, *T. paupi* Allen, Basse Terre, St. Kitts, forewing, ♂. Figs. 16–17, *T. grenada*, n. sp., Grenada: 16, left tegula, ♂, showing marginal groove; 17, hind basitarsus, ♀, showing groove on inner face.

extension, its apex usually with a sharp bend; anterior sector of second cubital cell 1.15 to 1.2 times as long as posterior sector (2 measured).

Dorsal propodeum with sulcus bordering transverse carina deep and separated into conspicuous pits by strong cross ridges; areola subrectangular to keystone-shaped, scarcely one and one-half times as long as apical width, median carina reduced to an elongate basal protuberance. Tergum 1 with a strong transverse carina; preapical band of coarse punctures in a narrowly linear row, slightly impressed. Intermediate terga polished, not shagreened, with punctures nearly uniform in size with nearly impunctate areas on terga 3 and 4. Sternum 5 without lateral denticles.

Length, 6.8 to 8.2 mm.

Female.—Unknown.

Holotype.—♂; Santa Rita "Ensenada," Puerto Rico (E. H. Barrow) [USNM].

Paratypes.—2; same data as holotype [USNM]. 1; "Taxco," P.R., Aug. 1921 (H. E. Barrows) [USNM]. 1; San Sebastian, P.R., 26-XI-

1938 (G. N. Wolcott) [USNM]. 1; Coloso, P.R., 8-XI-1939 (Wolcott & Martorell) [USNM]. 1; Rio Piedras, 1-II-1940 (G. N. Wolcott) [USNM].

Discussion.—This species shares most of the characters of *jamaica*. However, it differs in having a greater ratio between head width and distance between eyes, in a complete absence of shagreening on tegula and dorsal abdomen, and in having more conspicuous pits bordering the transverse carina of the propodeum.

8. *Tiphia* (*Tiphia*) *jamaica*, n. sp.
(Fig. 14)

Male.—Front with coarse primary punctures of first-degree density on lower half, principally of second-degree on upper half without interspaces as wide as an ocellus; secondaries numerous on lower half. Head width 2.0 times least distance between eyes (6 measured were 2.0, 2.0, 1.9, 2.0, 2.0, 2.0). Cheek about as wide as an antennal fossa.

Dorsal pronotum with transverse carina high, sharp-crested, its bordering sulcus with only a few obscure cross ridges near humeral angle; punctures small, uniformly distributed, separated in most directions by more than their average diameter. Lateral pronotum with obscure escarpment part way across lower disc. Mesopleuron on outer disc with small primary punctures separated by much more than their average diameter; sometimes a few secondaries on upper part; subtegular patch of dense microsetae much narrower than tegula. Legs and tegula generally piceous. Hind tibia on inner face uniformly carinate almost to friction plate. Tegula (fig. 14) broadly and conspicuously shagreened, without groove on outer margin. Forewing with membrane slightly infuscated; radial cell greatly exceeding second cubital cell in lateral extension; anterior sector of second cubital cell usually only slightly longer than posterior sector (in 3 the ratios were 1.25, 1.2, and 1.1).

Dorsal propodeum lateral to areola shining, with only very faint sculpturing; areola keystone-shaped, about one and one-half times apical width, its median carina incomplete and slenderly triangular, Tergum 1 with well-developed transverse carina; preapical band in a broad, very shallow depression and consisting of punctures of first-degree density, not impressed and about 2 punctures wide, separated from apex by about 3 times diameter of largest punctures. Tergum 2 with cross ridges of anterior sulcus strong, uniform, not reduced in length or height medially. Sternum 2 without well-developed keel-shaped callosity. Intermediate terga usually broadly shagreened; punctures of moderate size, rather widely spaced and relatively uniform in size and distribution.

Length, 5.8 to 7.3 mm.

Female.—Unknown.

Holotype.—♂; Mandeville, Manchester, Jamaica, 8/9-I-1920, 2,131 ft. [AMNII].

Paratypes.—3; "Dunrobin Dist.," Mandeville, Manchester, Jamaica, 15-I-1920, about 2,350 ft. [AMNH]. 1; same locality as holotype, collected Dec. 14, 1919 [AMNH]. 1; same locality as holotype, col-

lected Dec. 11, 1919 [AMNH]. 4; Jamaica [AMNH]. 1; Mandeville, Jam., Oct. 1892, at flowers of fennell (Cockerell) [USNM]. 1; Constant Spring, St. Andrews, Jam. about 650 ft., 6-II-1920 [AMNH]. 1; Hardwar Gap, Jam., 4,000 ft. 30-VII-1966 (A. T. Howden) [CNC]. 2; Hardwar Gap, Jam., 4,000 ft., one each on 12-VII and 29-VII-1966 (Howden & Becker) [CNC].

9. *Tiphia* (*Tiphia*) *paupi* Allen & Krombein

(Fig. 15)

Tiphia paupi Allen & Krombein, 1961, Trans. Amer. Ent. Soc. 87:62.

Diagnosis.—Male. This species differs from other known West Indian species in having no transverse carina on tergum 1, and a radial cell of the forewing (fig. 15) which terminates far before that of the second cubital cell and has its apex directed strongly inward toward the costal margin.

Discussion.—A more detailed description appears in the above reference. The species was described from a single male from Port-au-Prince, Haiti. The holotype is in the U. S. National Museum. I have identified 16 males taken at Basse Terre, St. Kitts in the collection of Cornell University which agree in every detail with the type from Haiti. There are also in the American Museum of Natural History, 2 males from Haiti, one from "Carrefour" and the other from "La Morniniere." The female is unknown. A male in the collection of the California Academy of Sciences, taken at Sevilla, Valle, Columbia is tentatively assigned to this species, although its locality is in a different environment several hundred miles away from the type locality.

10. *Tiphia* (*Tiphia*) *grenada*, n. sp.

(Figs. 16, 17)

Male.—Front with coarse contiguous punctures except on a very small area about ocellar triangle; secondaries almost absent. Cheek about as wide as an antennal fossa. Head width 2.2 times least distance between eyes (5 measured were 2.1, 2.2, 2.2, 2.2).

Dorsal pronotum with high, sharp-crested transverse carina bordered by a conspicuously scalariform sulcus; punctures small, on discs separated by more than their average diameter. Lateral pronotum with a deep narrow groove across its disc. Mesopleuron on outer disc with moderate-sized punctures, separated in most directions by more than their average diameter, and a very few large secondaries. Legs generally piceous; hind tibia with a broad median naked streak about sensorium fading out far before base of joint. Tegula (fig. 16) with a fine groove continuous about outer and posterior margins; not shagreened at least on outer slope. Forewing with membrane strongly infusate; radial cell greatly exceeding second cubital cell in lateral extension, its terminal section not sharply bent; anterior sector of second cubital cell 1.2 times as long as posterior sector (4 measured were 1.15, 1.2, 1.2, 1.2).

Dorsal propodeum with areola keystone-shaped, terminating in a high transverse carina; about one and one-half times as long as apical width; median

carina often greatly reduced in length. Tergum 1 without transverse carina; preapical band at bottom of broad, shallow depression and consists medially of single row of closely spaced punctures separated from apex by 4 to 5 times their average diameters. Terga 3 to 5 not shagreened; with punctures of moderate size and uniform in size and distribution. Sternum 2 without bare keel-shaped callosity. Sternum 5 without lateral denticles.

Length, 6.0 to 7.4 mm.

Female.—Front with coarse punctures, contiguous on lower two-thirds, of second-degree density above.

Dorsal pronotum without transverse carina, its coarse punctures slightly more concentrated on anterior and posterior borders of punctate part. Lateral pronotum with conspicuous narrow groove across disc. Mesopleuron on outer disc with coarse primary punctures separated in most directions by more than their average diameter, with large secondaries slightly less numerous than the primaries; subtegular patch of dense microsetae wider than tegula. Scutum with anteromedian escarpment and notauli strongly connected. Hind basitarsus (fig. 17) with a deep, narrow groove. Hind tibia ham-shaped, scarcely angular in cross section, with arched upper margin. Tegula resembles that of male in absence of shagreening and in having a fine uniform groove about outer apical margin. Forewing with membrane moderately infuscate; stigma separated by about its length from basal vein. Tergum 1 with preapical band an irregular row, over much of middle 1 to 2 punctures wide, and not impressed. Terga 3 and 4 with lateral impunctate areas, otherwise with punctures of median size and uniform in size and distribution; punctures separated from apices by 2 to 3 times their maximum diameter. Pygidium rugose (not punctate) on apical two-thirds; narrow, non-rugose apex without shagreening.

Length 9.5 to 11.0 mm.

Holotype.—♂; St. George, Grenada, "BWI," Nov. 1950 (N. L. H. Kraus) [USNM].

Allotype.—♀; same data as type. [USNM].

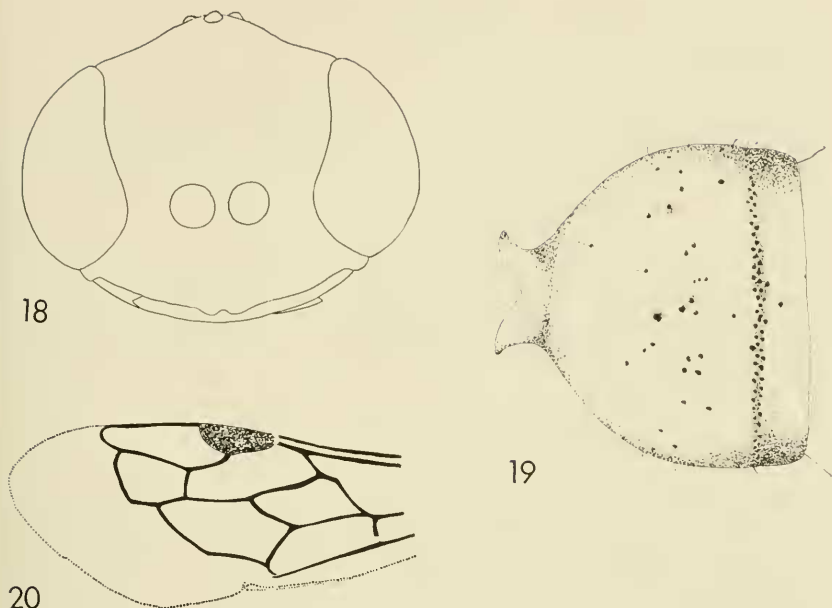
Paratypes.—5♂♂; same data as type [USNM]. 1♂, 3♀♀; St. Vincent, W. I. (H. H. Smith) [USNM]. 1♂; Grenadines, W. I., 119-VIII-1929 (Bartsch & Hoffman) [USNM].

Discussion.—The most distinctive characters of the male are, the narrow groove on the lateral pronotum, the fine regular marginal groove of the tegula, and the absence of a transverse carina on tergum 1. Since the female taken with the males of the type series has the same tegular character it is presumed to be the same species. One male collected by Z. I. Boven in Surinam on 19-IV-1927 in the Cornell University Collection is tentatively identified as *grenada*.

11. *Tiphia* (*Tiphia*) *kenscoffi* Allen & Krombein
(Figs. 18, 19)

Tiphia kenscoffi Allen & Krombein, 1961, Trans. Amer. Ent. Soc. 87:60.

Descriptive Notes.—Male. Front with moderately coarse primary punctures of first-degree density except narrowly around the ocellar triangle; secondaries



Figs. 18–19, *Tiphia kenscoffi* Allen, Kenscoff, Haiti: 18, outline of head, ♂; 19, tergum 1, ♂, without transverse carina. Fig. 20, *T. howdeni*, n. sp., Hardwar Gap, Jamaica, forewing, ♂.

numerous on lower half. Head width 2.2 times least distance between eyes (3 measured were 2.2, 2.15, 2.2). Cheek slightly narrower than antennal fossa. Outline of head, fig. 18. Mandible with break in outline at usual position of preapical denticle.

Dorsal pronotum with high, sharp carina; bordering sulcus with only obsolete cross ridges; punctures coarse, in some areas and also on scutum of first-degree density. Lateral pronotum broadly polished without groove across disc. Mesopleuron with coarse primary punctures largely of second-degree density and small secondaries slightly more numerous than the primaries. Legs chiefly black. Hind tibia usually carinate on inner face to near basal friction plate. Tegula not shagreened; with an irregular marginal groove interrupted at outer apical angle and diminishing to shallow crease anteriorly. Forewing with its membrane almost hyaline; radial cell relatively short, being 2.5 times as long as wide, and moderately exceeding second cubital cell in lateral extension; anterior section of second cubital cell 2.2 times as long as posterior section (3 measured were 2.2, 2.2, 2.15).

Dorsal propodeum with its lateral area polished, free of notable sculpturing; areola usually rectangular, slightly more than twice as long as wide. Tergum 1 (fig. 19) without anterior transverse carina; preapical band a single more or less irregular row of coarse punctures at bottom of very shallow concavity and separated from apex by at least 2 puncture diameters. Intermediate terga not shagreened; with sparse, relatively shallow, moderate-sized punctures none of

which are greatly enlarged. Sternum 2 with a slight, polished median keel-like callosity. Sternum 5 without lateral denticles.

Length, 6.5 to 8.5 mm.

Discussion.—The female is unknown. The holotype is in the U. S. National Museum. The descriptive notes above amplify the sketchy original description. They are based on several paratype specimens having the same data as the holotype. The entire type series was collected by G. N. Wolcott at Kenscoff, Haiti on April 26, 1927. This Haitian species seems most closely related to *howdeni*. However, the Jamaican species, has much smaller and more widely separated punctures on front, dorsal pronotum and scutum. In addition to the type series from Kenscoff, Haiti, 1 male has been collected by G. N. Wolcott at Petionville, Haiti.

12. *Tiphia* (*Tiphia*) *howdeni*, n. sp.
(Fig. 20)

Male.—Front with small primary punctures of third-degree density on upper two-thirds except on eye border, without interspaces as wide as an ocellus. Head width 2.4 times least distance between eyes (3 measured were 2.4, 2.3, 2.4). Cheek distinctly narrower than antennal fossa. Mandible without pre-apical cusp.

Dorsal pronotum with high, sharp-crested transverse carina; bordering sulcus with only a few obscure cross ridges; punctures unusually small and generally separated by several times their average diameter. Scutum shagreened, with punctures everywhere separated by more than their average diameter. Lateral pronotum without groove across middle disc. Mesopleuron shagreened; on outer disc with very small primary punctures separated by much more than their average diameter; secondaries minute and slightly more numerous than primaries. Legs black. Hind tibia on inner face completely ciliate except small area about sensorium, without ridge or naked stripe. Tegula broadly shagreened, with marginal groove broken into line of punctures at outer apical angle. Forewing (fig. 20) with radial cell much exceeding second cubital cell in lateral extension.

Dorsal propodeum with lateral carina of areola slightly sigmoid, length about one and one-half apical width, middle carina expanded basally, nearly complete. Tergum 1 without transverse carina; preapical band of coarse punctures, narrowly linear, essentially one puncture wide. Intermediate terga shagreened; punctures very fine and tending to uniformity in size. Sternum 5 without lateral denticle.

Length, 6.0 to 6.9 mm.

Female.—Unknown.

Holotype.—♂; Hardwar Gap, Jamaica, 4,000 ft., 29-VII-1966 (Howden & Becker) [CNC].

Paratypes.—3; same data as holotype [CNC]. 1; same locality as holotype, 16-VII-1966 [CNC].

Discussion.—Only three species have been found in the Caribbean area on the males of which the transverse carina on tergum 1 is lacking and the radial cell is elongated. They are *dominicæ* from Dominica,

kenscoffi from Haiti and *howdeni* from Jamaica. *T. dominicae* has an exceptionally narrow cheek, while this dimension in *kenscoffi* and *howdeni* are intermediate. In *kenscoffi* the punctures are coarse, the dorsal pronotum, scutum, and mesopleuron are not shagreened; and the radial cell at 2.5 times as long as wide is appreciably shorter than that of *howdeni* at 2.8 times its width.

13. *Tiphia* (*Tiphia*) *laudata*, n. sp.

Female.—Front with punctures of first-degree density on lower half, and in type on much of upper half without interspaces wider than an ocellus.

Dorsal pronotum with dorsal and anterior planes meeting at a right-angular junction separated by an obscure transverse carina; punctures coarse, largely of first-degree density except a restricted area on lateral discs. Lateral pronotum with patch of parallel rugulae in ventral corner. Scutum medially with cluster of coarse punctures of first-degree density; anteromedian escarpment connected with notaulices. Mesopleuron broadly shagreened; outer disc with primary punctures separated in one or more directions by distances greater than their average diameter, and with large secondaries almost as numerous as primaries; subtegular patch of dense microsetae much narrower than tegula. Hind tibia angular in cross section, its upper margin not arched; sensorium flush with surrounding area which is reddish. Hind basitarsus grooved. Tegula moderately shagreened; without marginal grooves. Forewing with its membrane moderately infuscated; with stigma separated by about its length from basal vein; radius terminating in strong, outwardly directed spur.

Dorsal propodeum beside areola free of sculpturing; areola rectangular, slightly more than twice as long as apical width; median carina slightly expanded at base. Tergum 1 with an obscure transverse carina, interrupted at middle; preapical band a single irregular row of fine punctures separated at places by much more than their average diameter, not impressed, and separated from apex by 3 times diameter of largest adjacent punctures. Pygidium punctate on basal half; impunctate apex not shagreened.

Length, 11.0 to 12.6 mm.

Male.—Unknown.

Holotype.—♀; Dominica, June–July, 1913 (H. W. Foote) [USNM].

Paratype.—1; "Laudet," Dominica "B.W.I.," 20-VI-1911 [AMNH].

Discussion.—Although the transverse carina of tergum 1 is obscure and interrupted, no other species from the West Indies are known in which the female possesses such a carina. The paratype has frontal punctures more widely dispersed, a more regular preapical band on tergum 1, but is probably the same species as the type.

14. *Tiphia* (*Tiphia*) *dowi* Allen & Krombein

Tiphia dowi Allen & Krombein, 1961, Trans. Amer. Ent. Soc. 87:65.

Diagnosis.—Female. Impunctate part of dorsal pronotum not shagreened. Outer disc of mesopleuron with coarse punctures scarcely of first-degree density. Hind basitarsus grooved. Tegula not shagreened and without groove on outer

margin. Forewing having a definite spur on end of radius which is directed toward the nearest intersection with the costal margin. Tergum 1 without transverse carina; with preapical band slightly irregular, slightly impressed and 1 to 2 punctures wide. Terga 3 and 4 with conspicuous impunctate spots. Pygidium with its impunctate apex broadly shagreened. Length 9 to 10 mm.

Discussion.—This species which was described from Cuba is very close to *wolcottii* from Haiti, and may eventually prove to be conspecific. The specimens of *dowi* I have seen have a well-defined spur at the tip of the radius directed to the nearest point on the costal margin, while *wolcottii* normally has no terminal spur. For the present it seems advisable to consider them as distinct species. *T. dowi* was described from the holotype and three paratypes in the Museum of Comparative Zoology at Cambridge. The male is unknown.

15. *Tiphia* (*Tiphia*) *wolcottii* Allen & Krombein

Tiphia wolcottii Allen & Krombein, 1961, Trans. Amer. Ent. Soc. 87:61.

Diagnosis.—Female. Punctures on upper front coarse, of second-degree density, but without interspaces as broad as an ocellus except sometimes on the median vitta. Dorsal pronotum with punctures fairly uniformly distributed; impunctate part definitely not shagreened. Hind basitarsus with groove. Tegula not shagreened at least on outer slope. Sternum 2 without a keel-shaped callosity. Pygidium broadly shagreened to near tip of impunctate apex. Length 10 to 13.5 mm.

Discussion.—The male is unknown. Among the three species of females of *Tiphia* described from Haiti, only *wolcottii* and *haiti* have a grooved basitarsus. These two species appear to be quite closely related but *wolcottii* consistently lacks shagreening on the impunctate apex of the dorsal pronotum and on the outer slope of the tegula. *T. wolcottii* was described in detail (Allen & Krombein, 1961) from the holotype female deposited in the United States National Museum, and 66 paratype females from Kenscoff. A few additional specimens, also from Kenscoff, have been identified. Many of the specimens were taken at 4,000 ft. elevation on *Daucus carota*.

16. *Tiphia* (*Tiphia*) *nitida* Smith

Tiphia nitida Smith, 1855, Cat. Hym. Brit. Mus. 3:84.—Allen, 1962, Trans. Amer. Soc. 88:56.

Diagnosis.—Female. Front with coarse punctures on lower half principally contiguous. Dorsal pronotum with nearly complete transverse carina; impunctate except for a transverse band of scattered punctures of assorted sizes, and 4 or 5 anterior to this row medially. Lateral pronotum with groove across disc. Outer disc of mesopleuron almost devoid of punctures. Hind basitarsus grooved. Tegula faintly shagreened; with a marginal groove. Radial cell of forewing terminating in an outwardly directed stump. Tergum 1 without anterior transverse carina; preapical band not impressed and one row wide over most of middle area.

Pygidium punctate on basal half; impunctate apex faintly shagreened near punctate part. Length 12 mm.

Discussion.—The type female of *nitida* from Jamaica in the British Museum was recently redescribed in detail. It appears to differ from other described West Indian species in having a smoother body, and a very sparsely punctate dorsal pronotum. The male is unknown. No other specimens have been seen.

17. *Tiphia* (*Tiphia*) *haiti* Allen & Krombein

Tiphia haiti Allen & Krombein, 1961, Trans. Amer. Ent. Soc. 87:62.

Diagnosis.—Female. Punctures on entire front and punctate part of dorsal pronotum of coarse first-degree density. Impunctate part of dorsal pronotum broadly shagreened. Hind basitarsus with groove. Tegula, including outer slope conspicuously shagreened. Sternum 2 with an obscure keel-shaped callosity. Pygidium with impunctate part shagreened to apex. Length 10 to 13.5 mm.

Discussion.—The male is unknown. The holotype and most of the 23 paratypes collected at Kenscoff on *Daucus carota* at 4,000 ft. elevation, are in the U. S. National Museum. They appear to differ consistently from *wolcottii* in having a broadly and conspicuously shagreened tegula, also shagreening on the impunctate part of the dorsal pronotum. In addition to the type series, 9 specimens from Kenscoff and one from Mt. Puilsboreau, Haiti have been identified. One additional female collected by H. H. Smith on St. Vincent [in USNM] has also been tentatively identified as this species.

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